

# ImageXpress UnTechnical Bulletin

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COLOR SEPARATION BASICS

## Why Seps Are Necessary



*All I want to do is see the same image on paper that I saw on the computer screen. Is that asking so much? What's the big deal? Just print the silly thing!*

### **What We Have Here is a Failure to Communicate**

While it seems a simple task to print a picture, there are issues behind the scenes that will have to be addressed if you want the picture to look like what you see on the computer monitor. Computer monitors display pictures using an entirely different technology than pictures printed on paper. Let's look at a similar situation.

If you speak only English and visit a part of the world where they do not speak English, you will either need the services of a translator or you'll have to buy one of those nearly-useless pocket phrase books.

Similarly, if you travel to a foreign country, you will have to convert your currency to that of the country you are visiting. Each country has its own currency, and for the most part, you either go with the native currency or you go without. Pesos have little purchasing power in Paris.

Printing color pictures presents the same conversion problem. If you want to go from an RGB-based color system (like a computer monitor) to a CMYK-based color system (like a printing press), the "currency" of your picture will have to be converted from RGB values to CMYK values. There are no RGB presses, and few RGB printers. CMYK printing presses simply can't comprehend RGB.

### **The Computer Monitor**

Computer monitors display images by combining amounts of red, green, and blue light in varying intensities. Most of the visible color spectrum can be displayed this way. This is additive color because projecting equal amounts of red, green, and blue light creates white light.

### **The Printing Press**

In order for a picture that is viewed on a computer monitor to be printed it must go through a color conversion. Computer monitors work by projecting colored light onto a transparent glass screen, while printing presses put semi-opaque inks onto opaque paper. To view an image printed on paper, it must be viewed by reflected light. Printing systems work on the subtractive principle. To produce white, you subtract cyan, magenta, yellow and black. On paper, white is the absence of ink.

### **Something Got Lost in the Translation**

Just as there are some words in the English language that simply don't have an equivalent in another language, some colors seen in RGB simply have no way of being represented in CMYK. There are two similar but distinct color systems here and each has its own limited array of colors. Some of these colors are so unique that they simply cannot be represented in another system. Each color system's unique spectrum is referred to as its gamut.

### **A Very Costly Assumption**

While we understand that it is necessary to convert images to CMYK for print, we also need to understand that the word *print* can mean a variety of things. Every printing device and printing press requires a unique color separation formula. Using one "general" separation table/profile for every printing process is like expecting a single type of shoe to meet the requirements of every occasion. Can you imagine climbing Mt. Everest in ballet slippers? Pretty dumb, but not much dumber than using a single separation formula for every kind of printing process.

Converting images from RGB to CMYK is not a one-size-fits-all situation. There are several good reasons why this is so... paper, ink, and printing presses.

## **Blame it on the Paper**

Believe it or not, the need for so many separation tables/profiles rests primarily on the paper. Coated papers absorb ink less than uncoated papers, and uncoated papers absorb less than newsprint. A single picture printed on different papers can look significantly different. You can observe this phenomenon occasionally in publications when an advertiser includes a tear-out postcard along with their ad. Sometimes the same separation is used for the postcard (vellum- construction paper) as was printed in the pub (coated paper). While the ad separation looks great, the postcard version is dark and muddy. This situation called for two specific separations, one for the publication and one for the card.

Porous papers require separations that allow for the increased amount of ink absorption. If your proofing system does not compensate for dot gain, be prepared to see proofs that appear light and washed-out.

## **Blame it on the Ink**

The exchange of values from RGB to CMYK is not an exact one. There are color hues and intensities of RGB-based colors that cannot be replicated in CMYK inks. This disparagement is referred to as "out of gamut."

Since computer monitors use transmitted light and electrically-charged phosphors, colors are displayed more vividly than they can be reproduced by a printing press. Remember, the brightest white you'll see from a printing press is the color of the paper, while monitor white can be as bright as light itself. Unfortunately, colors suffer from a similar limitation.

## **Blame it on the Press**

There are many kinds of printing presses. The most common are sheet-fed, heatset web, and non-heatset web. Most sheet-fed presses are offset type presses, but some are letterpress type presses. There are also rotogravure, flexographic, intaglio and silk screen presses. And the list goes on and on. Each of these presses require unique types of separations. When we add to this menagerie of presses, the tremendous variety of printing papers that are available to print on, the need for specific separation properties becomes quite apparent.

## **The Right Stuff**

There is a single conclusion to be drawn from all this. Good printing results from careful preparation and intelligent choices. Do your homework, be discerning, and discriminating. Inquire about needs and requirements of each device and/or printing process to be used, and ask for appropriate profiles or separation tables from service bureaus and printers. Whenever possible, know the press and paper to be used before converting your file to CMYK, and separate accordingly.

Never again blindly choose "Separation" from the menu or dialog without knowing what's going to happen to your picture.

*Never forget that your reputation is attached to every project you take on. As the adage goes, "you never get a second chance to make a first impression."*

## **Color Separations and ScanPrepPro**

ScanPrepPro generates color separations by either of two methods, it's traditional separation tables (SPP-Separation Tables) or ICC profiles. And the has the choice of using ScanPrepPro's automatic profile selector (SPP-ICC Profiles). Both handle the conversion process automatically and without need of user expertise. The user can also choose any CMYK profile loaded in the System's ColorSync folder. All choices are available from ScanPrepPro's Preference dialog.

ScanPrepPro provides seven default tables and profiles that address most device or press/paper combinations. To accommodate other press/paper conditions, ScanPrepPro provides adjustable dot gain controls for each color ink from the Range/Gain menu of the main dialog.

For those who desire to take a "hands-on" approach, ScanPrepPro affords the user the ability to choose specific third party profiles or separation tables. For the stout of heart, ScanPrepPro also provides the ability to specify, save, and recall, custom separation setups (including dot gain compensation) directly from the main dialog.